

Remarks

Claims 1-3, 5-28 and 32-37 are pending in this application. Claim 37 stands rejected under 35 U.S.C. §112, second paragraph. Claims 1-3, 5-6, 8-10, and 32-35 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski et al. (US Patent Number 6,157,747), in view of Luken (US Patent Number 5,923,334), and further in view of Seago (US Patent Number 5,990,900). Claims 11-12, 22-28, and 36 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski in view of Seago. Claim 7 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski, in view of Luken and Seago, and further in view of Blank (US Patent Number 5,469,536). Claims 13-21 and 37 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski, in view of Seago, and further in view of Blank.

Claims 1, 11, 22, 32, and 36 have been amended to require that the object being modeled occupy a field of view of more than 180 degrees in the input image panorama(s). This limitation is taught at least in paragraphs 99-103 and figs. 28-34 of the subject application, where the walls of a room in the input panoramas, for example, clearly occupy a field of view of more than 180 degrees. Claims 1-3, 5-6, 8-9, 11, 13-22, 32-34, and 36 have been amended for consistency. In particular, the claims now refer to one object and the number of panoramas in each claim has been clarified. Claim 37 has been amended to require that at least one of the enumerated set of tools be included. No new matter has been added.

Claim Rejections – 35 U.S.C § 112, Second Paragraph

Claim 37 stands rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that Claim 37 recites, "wherein the one or more editing tools comprises a ground plane tool, an extrusion tool, a depth chisel tool, and a nonuniform rational B-spline tool."

Claim 37 has been amended to claim the above cited limitation in the alternative. Claim 37, as amended, is now clear and definite.

Claim Rejections – 35 U.S.C § 103(a)

A. Claims 1-3, 5-6, 8-10, and 32-35 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski '747 in view of Luken '334, and further in view of Seago '900.

The rejection of Claims 1-3, 5-6, 8-10 and 32-35 under 35 U.S.C. 103(a) as being unpatentable over Szeliski '747 in view of Luken '334, and further in view of Seago '900, lacks a prima facie case of obviousness because none of the references teaches modeling objects where the objects occupy a field of view of more than 180 degrees in the image panoramas.

Claim 1 of the subject application requires (in part), as amended:

"A computerized method for creating a three dimensional model from one or more image panoramas, the method comprising: receiving one or more image panoramas representing a visual scene and having an object, **the object occupying a field of view of more than 180 degrees** ; ...

(and) creating a three dimensional model of the visual scene from the transformed and aligned image panoramas using the reference coordinate

system, wherein creating a three dimensional model includes associating geometry information with the object, the geometry information comprising 3-D coordinates describing the position and orientation of the selected object in the reference coordinate system. (emphasis added).”

The Office Action admits that:

“Though Szeliski teaches creating a three-dimensional model of the visual scene (See Szeliski: Col. 5, Lns. 15-19, wherein the three-dimensional model of the scene is the texture-mapped polyhedron surrounding the origin.), Szeliski does not expressly suggest creating three-dimensional objects within the scene by individually modeling selected objects within the scene, and thus does not expressly suggest that creating a three dimensional model includes identifying a selected object in the transformed and aligned image panoramas and associating geometry information with the selected object, the geometry information comprising 3-D coordinates describing the position and orientation of the selected object in the reference coordinate system..” See, Office Action, page 7.

Likewise, Luken ‘334 does not teach creating 3D objects within a scene.

The Office Action cites Seago ‘900 for teaching the conversion of digitized two-dimensional images of objects into three-dimensional digital computer objects. (See, Office Action, page 13-14). The input to Seago’s method is a 2-D perspective image or a group of 2-D images displaying the object to be modeled. (See, e.g., Seago ‘900, col. 11, lines 45-47). Seago determines vanishing points for the planar faces of the object using parallel lines on the object and then derives a 3D coordinate system for the object using the vanishing points. (See,

Seago, steps 40 to 48, fig.2.) The features of the object are then modeled (See, Seago, step 50, fig. 2 and figs. 9-10.) The object to be modeled, therefore, must “fit” onto a display surface in Seago’s screen world coordinate space, so that the vanishing points for the object can be calculated, the coordinate system determined and the features of the object determined in the coordinate system. Seago’s object in the image(s) must occupy a field of view of no more than 180 degrees so that it can be viewed on the display screen.

In contrast, the subject application teaches a method of modeling objects using image panoramas that can be applied to objects occupying a field of view of greater than 180 degrees. For example, the wall of the room shown in figs 28-33 of the subject application occupies a field of view of more than 180 degrees within the panoramas. As described in paragraphs 98 to 102 of the subject application, the wall is modeled by identifying the intersection of the floors with the wall in the panoramas and then extruding the walls to form the 3D model of the room. Seago’s method for modeling 3D objects from 2D perspective images is inapplicable to objects occupying fields of view greater than 180 degrees because, for example, it is not possible to establish a 3D coordinate system for such an object by calculating vanishing points from the screen image. This follows because the entire object cannot be displayed on the screen to calculate the vanishing points from features in the object because the object occupies more than the 180 degrees that can be displayed on the screen at once.

To establish prima facie obviousness of a claimed invention, each claim limitation must be taught or suggested by the prior art. (See, e.g., MPEP 2143.03). As shown above, neither Szeliski '747, nor Luken '334 nor Seago '900 teaches the step of "creating a three dimensional model of the visual scene from the transformed and aligned image panoramas using the reference coordinate system, wherein creating a three dimensional model includes associating geometry information with the object, the geometry information comprising 3-D coordinates describing the position and orientation of the selected object in the reference coordinate system", where the object occupies a field of view greater than 180 degrees. Thus, Claim 1 cannot be obvious over any combination of Szeliski '747, Luken '334 and Seago '900. Claims 2-3, 5-6 and 8-10 depend from Claim 1 and add further limitations. Thus, Claims 2-3, 5-6 and 8-10 are deemed non-obvious over any combination of Szeliski '747, Luken '334 and Seago '900 for at least the same reasons as for Claim 1.

Claim 32 is deemed non-obvious over Szeliski '747, Luken '334 and Seago '900 for the same reasons as for Claim 1 because Claim 32, as amended, contains claim limitations analogous to the claim limitations cited above for Claim 1. Claims 33-35, which depend from Claim 32 and add further limitations, are deemed non-obvious over Szeliski '747 in view of Luken '334 and Seago '900 for at least the same reasons as for Claim 32.

B. Claims 11-12, 22-28, and 36 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski '747 in view of Seago '900.

The rejection of Claims 11, 12, 22-28 and 36, as amended, under 35 U.S.C. 103(a) as being unpatentable over Szeliski '747 in view of Seago '900 lacks a prima facie case of obviousness because neither of the references teaches modeling an object where the object occupies a field of view of more than 180 degrees in the image panoramas.

Claims 11, as amended, requires (in part):

“A computerized method of interactively editing objects in a panoramic image, the method comprising: receiving an image panorama representing a visual scene, the image panorama having an object and a point source, **the object occupying a field of view of more than 180 degrees in the panorama;** creating a three dimensional model of the visual scene using features of the visual scene and the point source, including associating geometry information with the object...” (emphasis added).

The Office Action relies on Szeliski '747 and Seago '900 for teaching the limitations of Claim 11 that are analogous to the limitations cited above for Claim 1. As shown above for Claim 1, neither Szeliski '747 nor Seago '900 teaches the step of “creating a three dimensional model of the visual scene using features of the visual scene and the point source, including associating geometry information with the object”, where the object occupies a field of view of greater than 180 degrees. Thus, a prima facie case of obviousness is lacking for Claim 11 for the combination of Szeliski '747 and Seago '900 and, therefore, Claim 11 is deemed non-obvious over Szeliski '747 and Seago '900. Because

Claim 12 depends from Claim 11 and adds further limitations, Claim 12 is deemed non-obvious over Szeliski '747 and Seago '900, for at least the same reasons as for Claim 11.

Further, Claims 22 and 36, as amended, are deemed non-obvious over Szeliski '747 and Seago '900 for at least the same reasons as for Claim 11, because Claims 22 and 36 contain claim limitations analogous to the claim limitations cited above for Claim 11. Claims 23-28, which depend from Claim 22 and add further limitations, are deemed non-obvious over Szeliski '747 in view of Seago '900 for at least the same reasons as for Claim 22.

C. Claims 13-21 and 37 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski '747, in view of Seago '900 and Blank '536.

The rejection of Claims 13-21 and 37 under 35 U.S.C. 103(a) as being obvious over Szeliski '747 in view of Seago '900 and Blank '536 lacks a prima facie case of obviousness because none of the references teaches modeling objects where the objects occupy a field of view of more than 180 degrees in the image panoramas.

The rejections of Claims 13-21 and 37 for obviousness rely on Szeliski '747 and Seago '900 for teaching the limitations of Claims 11 and 36 from which these claims depend, respectively. As shown above, neither Szeliski '747 nor Seago '900 teaches modeling objects where the objects occupy a field of view of more than 180 degrees in the input image panoramas. Further, Blank '536 does not provides the teaching, lacking in Szeliski '747 and in Seago '900, of modeling objects where the objects occupy a field of view of more than 180

degrees in the image panoramas. Thus, a prima facie case of obviousness cannot be made from any combination of Szeliski '747, Seago '900, and Blank '536 for Claims 11 and 36, because these references do not teach a required limitation of these claims. Because Claims 13-21 and 37 depend from Claims 11 and 36, respectively, and add further limitations, Claims 13-21 and 37 are deemed non-obvious over Szeliski '747 in view Seago '900 and Blank '536 for at least the same reasons as for Claim 11 and 36, respectively.

D. Claim 7 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Szeliski '747, in view of Luken '334 and Seago '900, and further in view of Blank '536.

The rejection of Claim 7 under 35 U.S.C. 103(a) as being obvious over Szeliski '747 in view of Seago '900, Luken '334 and Blank '536 lacks a prima facie case of obviousness because none of the references teaches modeling objects where the objects occupy a field of view of more than 180 degrees in the image panoramas.

As shown above, no combination of the Szeliski, Seago, Luken and Blank references teaches the step of “creating a three dimensional model of the visual scene from the transformed and aligned image panoramas using the reference coordinate system, wherein creating a three dimensional model includes associating geometry information with the object, the geometry information comprising 3-D coordinates describing the position and orientation of the selected object in the reference coordinate system”, where the object occupies a field of view greater than 180 degrees. Thus, a required limitation of Claim 7 is

not taught by the cited references. Therefore, Claim 7 is deemed non-obvious over any combination of the cited references.

Applicant requests reconsideration of all pending claims and a notice of allowance. The Examiner is requested to telephone the undersigned if any matters remain outstanding so that they may be resolved expeditiously. The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 19-4972.

Respectfully submitted,

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